

WHAT IS CLAIMED IS:

1                   1.       A multi-layer microwave interconnect module having a top surface and  
2 a bottom surface and comprising:

3                               four metal layers separated by a plurality of dielectric layers including  
4 a top signal layer on the top surface, a bottom metal layer on the bottom surface, an internal  
5 ground layer, and an internal signal layer, the top signal layer providing contacts for electrical  
6 components mounted on the module, the internal signal layer providing a metal trace for  
7 cooperating with the internal ground layer as a microstrip, and the bottom metal layer  
8 providing a bottom ground plane and at least one input/output contact, and

9                               conductive vias selectively connecting at least one contact in the top  
10 signal layer to the bottom ground plane, at least one contact from the top signal layer to the at  
11 least one input/output contact, and contacts in the top signal layer to the metal trace in the  
12 internal signal layer, the conductive vias extending from the top surface to the bottom surface  
13 for ease in fabrication, the internal ground layer having a metal pattern devoid of metal at a  
14 location of a via not connected to the ground layer.

1                   2.       The multi-layer microwave interconnect module as defined by claim 1  
2 and further including a solder mask overlying the bottom surface and the conductive vias  
3 selectively interconnecting contacts in the top surface to the metal trace in the internal signal  
4 layer.

1                   3.       The multi-layer microwave interconnect module as defined by claim 2  
2 wherein the dielectric comprises alumina.

1                   4.       The multi-layer microwave interconnect module as defined by claim 2  
2 wherein the dielectric layer is selected from the group consisting of FR4, Getek, and BT.

1                   5.       The multi-layer microwave interconnect module as defined by claim 2  
2 wherein the metal layer comprises copper.

1                   6.       The multi-layer microwave interconnect module as defined by claim 2  
2 wherein the metal layer comprises a gold plated refractory metal.

1                   7.       The multi-layer microwave interconnect module as defined by claim 1  
2 wherein the dielectric layer comprises alumina.

1                   8.       The multi-layer microwave interconnect module as defined by claim 1  
2       wherein the dielectric layer selected from the group consisting of FR4, Getek, and BT.

1                   9.       The multi-layer microwave interconnect module as defined by claim 1  
2       wherein the metal layer comprises copper.

1                   10.     The multi-layer microwave interconnect module as defined by claim 1  
2       wherein the metal layer comprises a gold plated refractory metal.

1                   11.     A microwave electronic module having a top surface and a bottom  
2       surface and comprising:

3                         four metal layers separated by a plurality of dielectric layers with a top  
4       signal layer on the top surface, a bottom metal layer on the bottom surface, an internal ground  
5       layer, and an internal signal layer, the top signal layer providing contacts for electrical  
6       components mounted on the module, the internal signal layer providing a metal trace for  
7       cooperating with the internal ground layer as a microstrip, and the bottom metal layer  
8       providing a bottom ground plane and at least one input/output contact,

9                         a plurality of electronic components mounted on the top surface of the  
10       module, and

11                        conductive vias selectively connecting at least one contact in the top  
12       signal line to the bottom ground plane, at least one contact in the top signal layer to the at  
13       least one input/output contact, and contacts in the top signal layer to the metal trace in the  
14       internal signal layer, the conductive vias extending from the top surface to the bottom surface  
15       for ease in fabrication, the internal ground layer having a metal pattern devoid of metal where  
16       a via is not connected to the ground layer.

1                   12.     The multi-layer microwave interconnect module as defined by claim  
2       11 and further including a solder mask overlying the bottom surface and the conductive vias  
3       selectively interconnecting contacts in the top surface to the metal trace in the internal signal  
4       layer.

1                   13.     The multi-layer microwave interconnect module as defined by claim  
2       12 wherein the dielectric comprises alumina.

1 14. The multi-layer microwave interconnect module as defined by claim  
2 12 wherein the dielectric layer is selected from the group consisting of FR4, Getek, and BT.

1 15. The multi-layer microwave interconnect module as defined by claim  
2 12 wherein the metal layer comprises copper.

1 16. The multi-layer microwave interconnect module as defined by claim  
2 12 wherein the metal layer comprises a gold plated refractory metal.

1 17. The multi-layer microwave interconnect module as defined by claim  
2 11 wherein the dielectric comprises alumina.

1 18. The multi-layer microwave interconnect module as defined by claim  
2 11 wherein the dielectric layer is selected from the group consisting of FR4, Getek, and BT.

1 19. The multi-layer microwave interconnect module as defined by claim  
2 11 wherein the metal layer comprises copper.

1 20. The multi-layer microwave interconnect module as defined by claim  
2 11 wherein the metal layer comprises a gold plated refractory metal.